

Erbe, L. H.; Zhang, B. G.

Oscillation of discrete analogues of delay equations. (English) Zbl 0723.39004
Differ. Integral Equ. 2, No. 3, 300-309 (1989).

The authors are concerned with the oscillation and nonoscillation of the solutions of first order linear and nonlinear difference equations with delay of the form $y_{n+1} - y_n + p_n y_{n-m} = 0$, $y_{n+1} - y_n + p_n f(y_{n-m}) = 0$, $y_{n+1} - y_n + p_n(1 + y_n)y_{n-m} = 0$, $y_{n+1} - y_n + p_n y_{n-m} = f_n$ and $y_{n+1} - y_n + \sum_{i=1}^k p_{in} y_{n-m_i} = 0$, where $n = 1, 2, \dots$, and m is a positive integer. Oscillation and nonoscillation criteria are established. Here a nontrivial solution is said to be oscillatory if for every $N > 0$ there exists an $n \geq N$ such that $y_n y_{n+1} \leq 0$. Otherwise it is nonoscillatory.

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MSC:

[39A10](#) Additive difference equations
[39A12](#) Discrete version of topics in analysis

Cited in **3** Reviews
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Keywords:

[oscillation](#); [nonoscillation](#); [first order linear and nonlinear difference equations with delay](#)